Operator's Manual

VALIDATOR®
8″ and 10″

Pelton & Crane

© Pelton & Crane, Inc.. 1988

L520-01-206-1771

TABLE OF CONTENTS

Visual Index 1

Section 1 – Familiarization 2

I. Safety Features 2
A. Door Lock 2
B. Safety Valve/Vent Valve 2
C. Overheat Protection 2
D. Electrical Power Interruption 2

II. Physical Characteristics 2
A. Exterior 2
B. Interior 2
C. Weight 2

III. Electrical Requirements 2

IV. Controls and Indicators 3
A. Switches 3
B. Indicator Lights 3
C. Visual Displays 4
D. Audible Signals 4
E. Reservoir Drain Tubes 4
F. Leveling Feet 5

Section 2 – Preparation for sterilization 6

I. Handling and Cleaning of Instruments 6
A. Handling 6
B. Cleaning 6

II. Special Preparation Guide for Carbon Steel Instruments 6

III. Tray Preparation and Loading 7
A. General Guidelines for Tray Preparation 7
B. Unwrapped Trays 7
C. Wrapped Trays and Instruments 8
D. Packs 9

IV. Handpiece Preparation 10

Section 3 – Operations 12

I. Start of Day 12

II. Sterilizer Operation 12

III. End of Day 13

Section 4 – Operational Checks 15

I. Operating Alarms 15

II. Self–Diagnostic Check 15

Section 5 – Maintenance **17**

I. Preventive Maintenance Schedule 17

II. Cleaning Procedures 17

A. Drain Reservoir 17

B. Normal Chamber Cleaning 17

C. Cleaning Deposits and Discoloration on Stainless Steel 18

D. Boiler Ring 18

E. Door Gasket 18

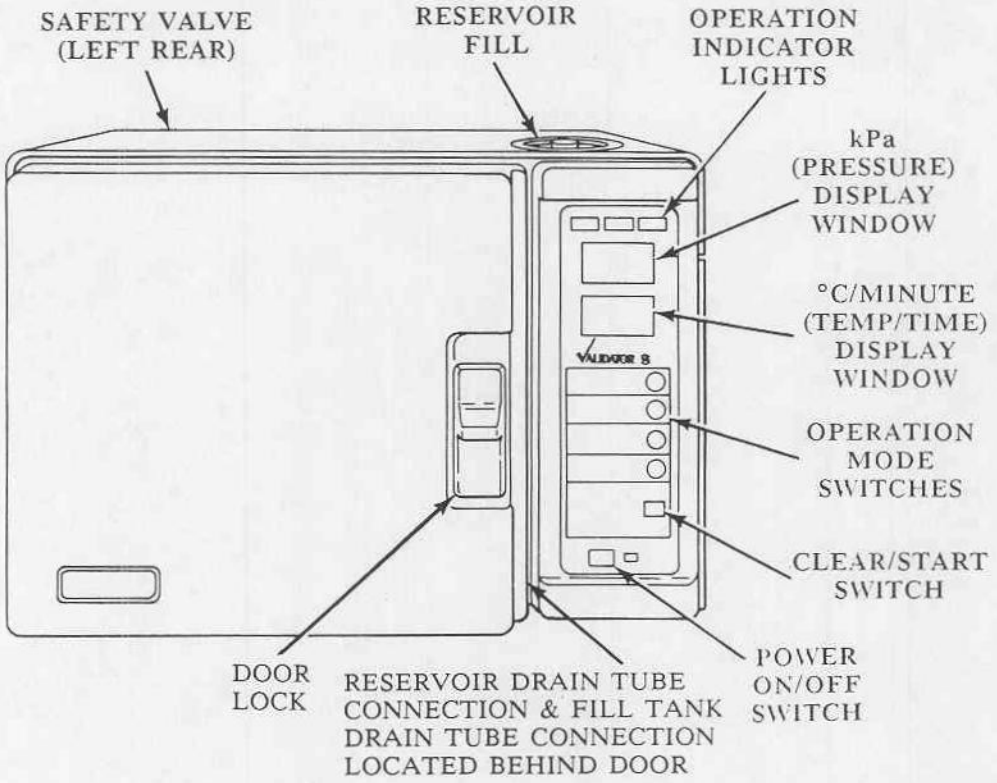
F. Air Valve 18

G. Exterior Surfaces 18

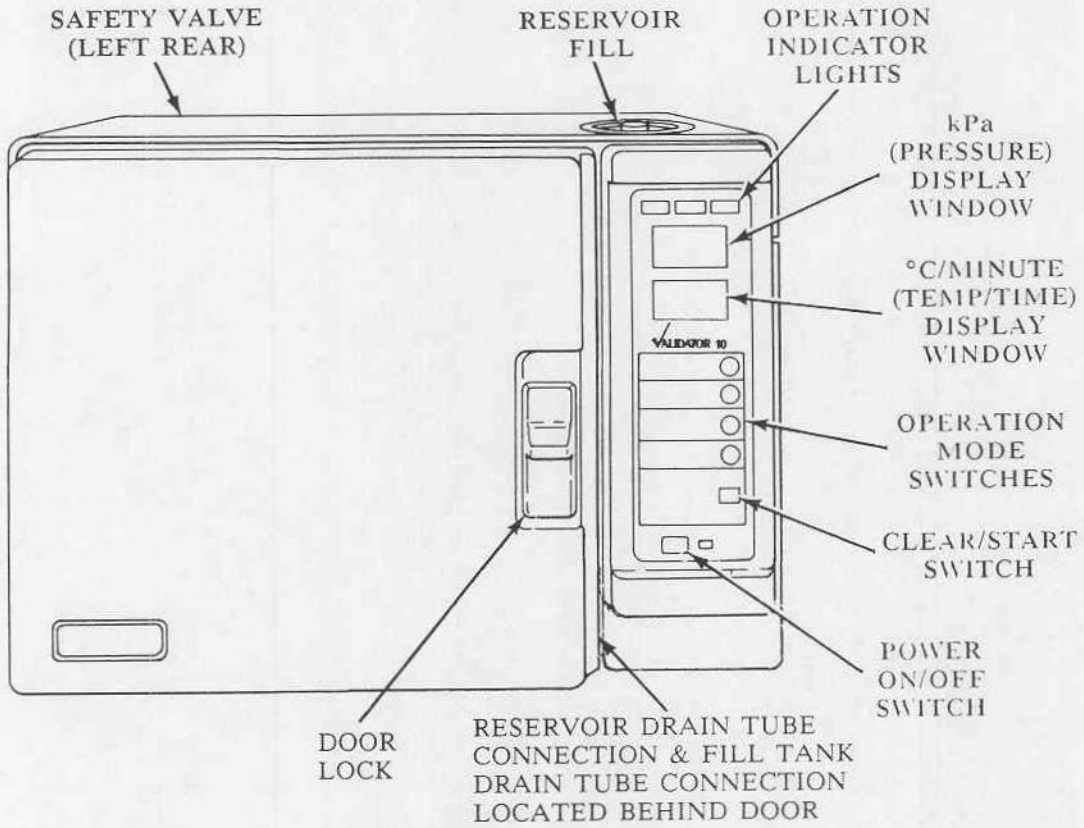
III. Sterilization Assurance 19

Glossary **20**

Autoclave Conversion Scale **21**


SAFETY VALVE (LEFT REAR)
RESERVOIR FILL
OPERATION INDICATOR LIGHTS
kPa (PRESSURE) DISPLAY WINDOW
°C/MINUTE (TEMP/TIME) DISPLAY WINDOW
OPERATION MODE SWITCHES
CLEAR/START SWITCH
POWER ON/OFF SWITCH
DOOR LOCK
RESERVOIR DRAIN TUBE CONNECTION & FILL TANK DRAIN TUBE CONNECTION LOCATED BEHIND DOOR

8″ VALIDATOR


SAFETY VALVE (LEFT REAR)
RESERVOIR FILL
OPERATION INDICATOR LIGHTS
kPa (PRESSURE) DISPLAY WINDOW
°C/MINUTE (TEMP/TIME) DISPLAY WINDOW
OPERATION MODE SWITCHES
CLEAR/START SWITCH
POWER ON/OFF SWITCH
DOOR LOCK
RESERVOIR DRAIN TUBE CONNECTION & FILL TANK DRAIN TUBE CONNECTION LOCATED BEHIND DOOR

10″ VALIDATOR

SECTION 1 – FAMILIARIZATION

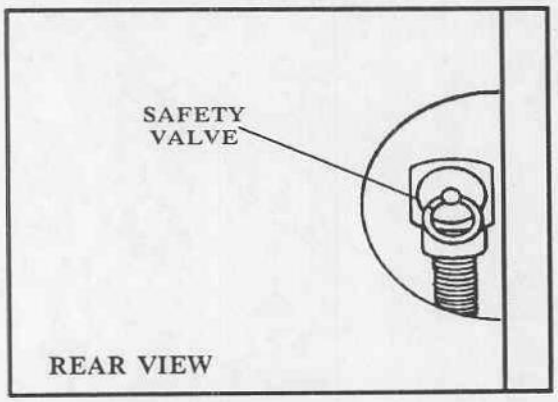
I. SAFETY FEATURES

The design of the Validator autoclave incorporates several safety features for your protection.

A. Door Lock

Chamber can be opened only when internal pressure is at atmospheric pressure.

B. Safety Valve/Vent Valve



1. Safety Valve – The safety valve opens as backup protection to reduce chamber pressure in the event pressure exceeds 262 kPa.
2. Vent Valve – If chamber pressure should exceed 225 kPa, the vent valve will open and a warning will sound.

C. Overheat Protection

Chamber temperature is set so as not to exceed 160°C and has an additional overheat protection if temperature reaches 180°C.

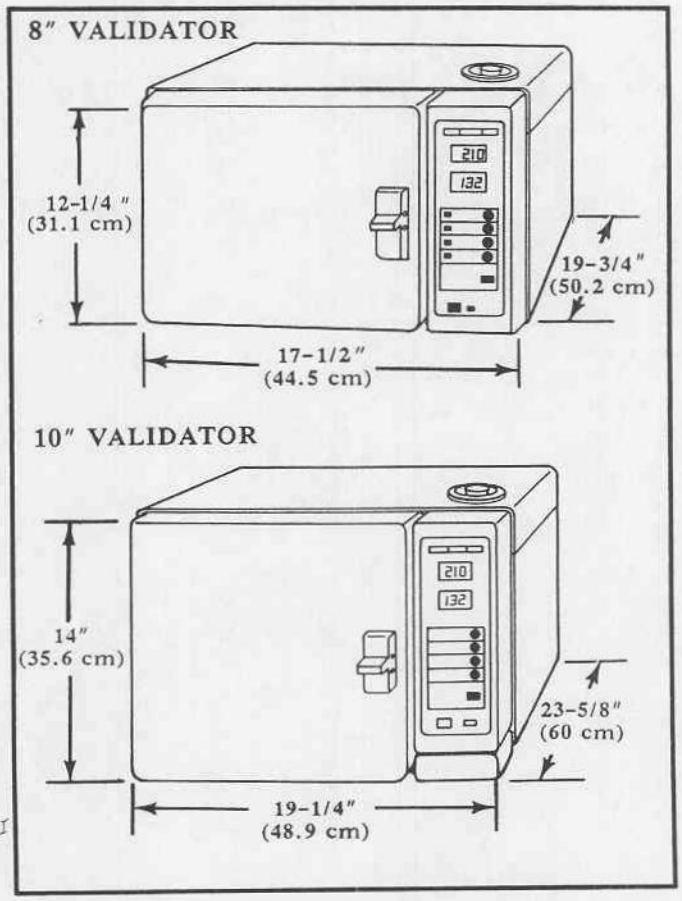
D. Electrical Power Interruption

In case of an electrical power failure during the sterilization cycle, pressure in the chamber is automatically vented to the atmosphere.

II. PHYSICAL CHARACTERISTICS

A. Exterior

The overall exterior dimensions of the 8″ model are 12–1/4″ (31.1 cm) high x 19– 3/4″ (50.2 cm) deep, add 1″ (2.54 cm) to include door handle in depth, x 17–1/2″ (44.5 cm) wide. The overall exterior dimensions of the 10″ model are 14″ (35.6 cm) high x 23–5/8″ (60 cm) deep, add 1″ (2.54 cm) to include door handle in depth, x 19–1/4″ (48.9 cm) wide.



B. Interior

The overall chamber of the 8″ model shall measure 8–1/4″ (21 cm) inside diameter by 14″ (35.6 cm) deep. The overall chamber of the 10″ model shall measure 9–7/8″ (25.1 cm) inside diameter x 17–1/2″ (44.5 cm) deep.

C. Weight

Without water in the reservoir, the weight is 72 lbs., 32 kgs. (8″ model), 95 lbs., 43 kgs. (10″ model).

III. ELECTRICAL REQUIREMENTS

Three models of the 8″ autoclave are available. One operates on 110–120 volts, 60 hertz alternating current (8.7 amperes nominal). A separate branch circuit, capable of sustaining a 1050 watt load, is recommended. Ensure autoclave is grounded by using the three-wire plug and a grounded receptacle.

One 8″ model operates on 220–240 volts, 50/60 hertz alternating current (4.4 amperes

nominal). A separate branch circuit, capable of sustaining a 1050 watt load, is recommended. Ensure autoclave is grounded using a three-wire plug (supplied by the user).

One 8" model operates on 90-110 volts, 50/60 hertz alternating current (10.6 amperes nominal). A separate branch circuit, capable of sustaining a 1050 watt load, is recommended. Ensure autoclave is grounded using a three-wire plug (supplied by the user).

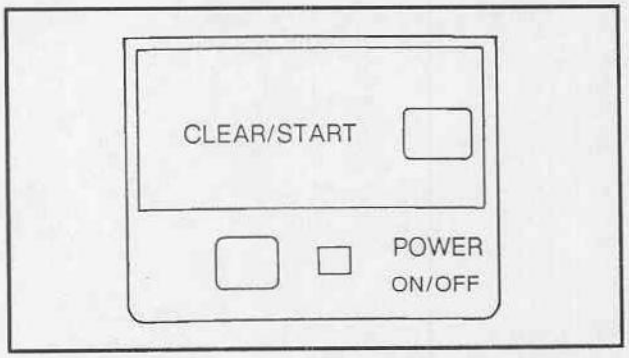
Two models of the 10" autoclave are also available. One operates on 110-120 volts, 60 hertz alternating current (10 amperes nominal). A separate branch circuit, capable of sustaining a 1200 watt load, is recommended. Ensure autoclave is grounded by using the three-wire plug and a grounded receptacle.

The other 10" model operates on 220-240 volts, 50/60 hertz alternating current (5 amperes nominal). A separate branch circuit, capable of sustaining a 1200 watt load, is recommended. Ensure autoclave is grounded using a three-wire plug (supplied by the user).

IV. CONTROLS AND INDICATORS

A. Switches

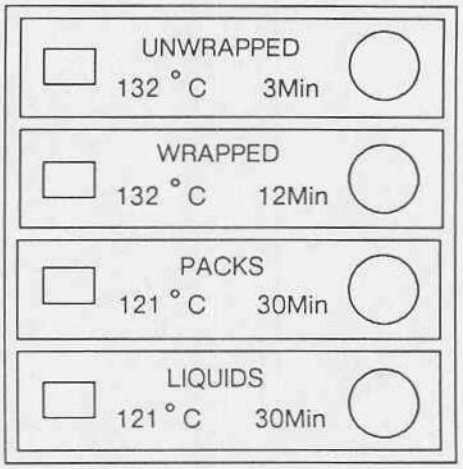
All switches are pressure sensitive push type and located on the front control panel.



1. Power - With the POWER switch in the ON position, the red power light is illuminated and electric power is supplied to the autoclave. The heater elements run at a lower power to preheat the chamber when no cycle is in progress. When in the OFF position, red light out, no electric power is available to the autoclave.

2. Clear/Start - The CLEAR/START switch controls the start of the sterilizing cycle and may be used to clear a cycle. When depressed to start, the cycle selected by the mode switch begins. When depressed to clear, the present program is interrupted and erased.

3. Operational Program Switches



a. Unwrapped Switch - Depress the UNWRAPPED switch to select a cycle at 132°C/210 kPa for 3 minutes. A red light illuminates to the left of the switch to verify selection of the UNWRAPPED program.

b. Wrapped Switch - Depress the WRAPPED switch to select a cycle at 132°C/210 kPa for 12 minutes. A red light illuminates to the left of the switch to verify selection of the WRAPPED program.

c. Packs Switch - Depress the PACKS switch to select a cycle of 121°C/128 kPa for 30 minutes. A red light illuminates to the left of the switch to verify selection of the PACKS program.

d. Liquids Switch - Depress the LIQUIDS switch to select a cycle of 121°C/128 kPa for 30 minutes followed by a slow vent. A red light illuminates to the left of the switch to verify selection of the LIQUIDS program.

B. Indicator Lights

1. Red STERILIZE Light –

   a. At the start of the sterilizing cycle, the red STERILIZE light comes on to indicate that the unit is approaching sterilization temperature and pressure.

   b. When the sterilization temperature and pressure are reached, the red STERILIZE light begins to flash, indicating the sterilization cycle is in progress.

   c. During venting, after the sterilization cycle is complete, the red STERILIZE light is constantly illuminated. This indicates the chamber pressure is being reduced to zero.

   d. Once chamber pressure reaches zero, the red STERILIZE light extinguishes.

2. Yellow DRY Light –

   a. The yellow DRY light indicates the heater is on for the drying cycle.

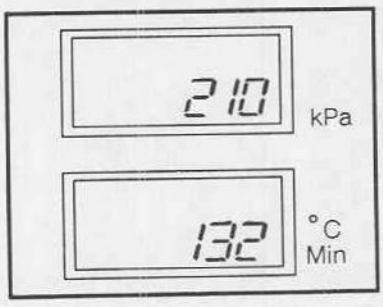
   b. After the sterilization cycle and vent are completed, the flashing yellow DRY light comes on (flashing green READY light is also on).

   c. The flashing yellow DRY light extinguishes and the heater turns off after 30 minutes.

3. Green READY Light –

   a. When the drying cycle is complete, the green READY light continues to flash, signaling that contents are dry and chamber may be unloaded.

C. Visual Displays



1. kPa Window – The kPa (pressure) window displays the internal pressure of the chamber in kilopascals during the sterilization cycle.

2. °C/Min Window – The °C/MIN window displays several readouts.

   a. Temperature – During the sterilization cycle the temperature of the chamber will be displayed in degrees Celsius.

   b. Time – The sterilization time for each programmed operation counts down to zero. At 0:00 minutes the pressure is vented to the atmosphere. The drying time counts up from zero to 30:00 minutes.

   c. Alpha Messages – This window also displays alpha numeric messages indicating alarm conditions, the end of the cycle, etc.

   NOTE: kPa is a unit of pressure such as PSI. 1 PSI = 6.89 kPa (see Autoclave Conversion Scale, page 20).

D. Audible Signals

1. One beep indicates the beginning of the self diagnostics or the selection of a programmed sterilization cycle.

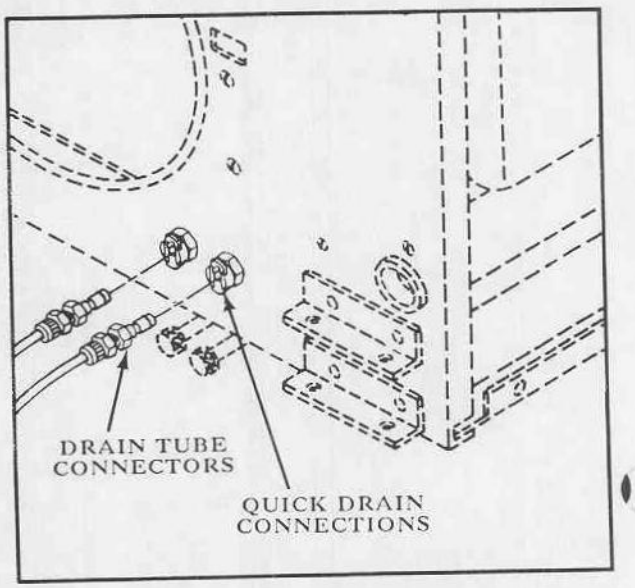
2. Five Beeps indicate the beginning of drying cycle.

3. Ten beeps indicate drying cycle is complete.

4. Continuous beeps for one minute provide warning of operational difficulty. Depress POWER switch or correct problem to silence beeper.

E. Reservoir Drain Tubes

1. Both 8" and 10" models have quick drain connections for the reservoir and fill tank located on the face plate behind the door. Two drain tubes are provided with the unit.



2. The earlier 8″ and 10″ models have a reservoir drain tube and a fill tank drain tube that can be extended up to 4″ (10.2 cm) out from under the front of the autoclave. The earliest 8″ models (serial nos. 1001–8570) have only a reservoir drain tube. Both tubes have a knurled closure cap.

F. Leveling Feet

Adjustable feet are provided on the front of the autoclave to compensate for uneven countertops. The unit must be reasonably level to ensure proper draining and proper water distribution inside the chamber.

SECTION 2 – PREPARATION FOR STERILIZATION

I. HANDLING AND CLEANING OF INSTRUMENTS

NOTE: Instruments must be thoroughly cleaned prior to placement in the sterilizer. Debris which remains on instruments impedes sterilization and may damage instruments.

A. Handling

1. Wear heavy rubber gloves while handling instruments. Clean gloved hands with a germicidal cleaner (iodophor surgical scrub). Wash gloved hands well when instrument handling is complete.
2. Transport soiled instruments to cleanup area on a tray. Protect your hands from contact with soiled instruments to prevent any serious infection.
3. Sort out any non-surgical devices or other instruments that cannot withstand immersion without rusting. See Table 2-1.

Table 2-1 ITEMS RECOMMENDED FOR STEAM STERILIZATION

Straight stainless steel instruments.
Surgical stainless steel hinged instruments.
Carbon steel instruments (see special preparation guide II.)
Air powered instruments made to be autoclaved (e.g. handpieces).
Heat resistant plastic items.
Rubber gloves.Rubber tubing.
Glass slabs, beakers and stones.
Gauze.
Liquids.

NOTE: Check manufacturer's recommendations for the individual items before autoclaving.

B. Cleaning

Items must be completely cleaned before sterilizing. Processing instruments with debris or blood contamination may result in staining and/or damage to instruments or sterilizer.

1. Rinse instruments with hard stream of water immediately after use to remove debris. Handle soiled instruments following procedure outlined in Section 2-I-A.
2. Sort instruments by type of metal. Do not mix carbon steel, stainless steel, brass, aluminum, chrome or other types of metals as plating may occur.
3. Wash instruments in an ultrasonic cleaner for five to 10 minutes immersed in a fresh solution of detergent and distilled deionized water or a germicide solution. Follow manufacturer's recommended procedures. Clean all instruments in an open position.

   NOTE: For best results use a detergent specifically designed for use in an ultrasonic cleaner with a neutral ph (7). (Healthsonics, Pleasanton, CA; L&R, Kearny, NJ, or comparable brand). A Germicide, 2% glutaraldehyde or equivalent solution with a neutral ph may also be used. Instrument soaking solutions containing phenols or quaternary ammonium compounds may cause corrosion of the instruments and trays or the stainless steel chamber. Sporicidin®, Lysol® and Omni II® are some disinfectants commonly used in dental practices that contain phenols. Discard and replace ultrasonic cleaning solution daily.
4. After cleaning, rinse instruments very thoroughly for 30 seconds. Inspect instruments to ensure that all debris has been removed. Repeat cycle as necessary.

   NOTE: To prevent staining, instruments should either be rinsed with deionized (distilled) water or dried after rinsing in tap water in areas with hard water (water with a high mineral/salt content).
5. Follow the recommendations by the instrument manufacturer on the use of lubricating products after instruments have been ultrasonicly cleaned. Use a silicon lubricant which will not affect sterilization.

II. SPECIAL PREPARATION GUIDE FOR CARBON STEEL INSTRUMENTS

A. Handle and thoroughly clean instruments as outlined above. (See Section 2-I, Handling and Cleaning of Instruments).

B. Prepare a 2% solution of sodium nitrite (one tablespoon per quart of water). Immerse instruments in the solution and allow them to remain for three minutes.

C. Remove instruments and prepare for sterilization. (See Section 2-III, page 6, Tray Preparation and Loading). Do not rinse or wipe instruments prior to sterilization.

NOTE: Do not place carbon steel instruments directly on the Validator's stainless steel tray. Line the tray with an unbleached towel or paper wrap prior to placing instruments.

D. Instruments which will be wrapped for sterilization should be packaged in a material which promotes drying.

NOTE: Instruments in packages may not dry well and may require use of an atmosphere reducer (Vapor–Phase, Lorvic Corporation, St. Louis, MO) for best results.

III. TRAY PREPARATION AND LOADING

A. General guidelines for tray preparation:

– An internal process indicator strip should be included with each sterilizer load to verify gross heat penetration.

– A biological spore test indicator should be used weekly in a representative sterilizer load for sterilization assurance.

– Date packages and resterilize after one month or according to packaging manufacturers' specifications.

– Sterilization indicators/monitors should be placed in the front bottom area of the sterilizer.

– **DO NOT** mix dissimilar metals in the same package or instrument damage may result.

– Make sure that all instruments are sterilized in an open position. (See AORN guidelines).

– Place all sharps (scissors, knives, skin hooks) so they do not touch during autoclaving. Cotton or gauze may be used to isolate and protect the sharp edges and the smaller instruments.

– Any item which might hold water should be placed so the water will drain out.

– Use small packs to separate larger ones.

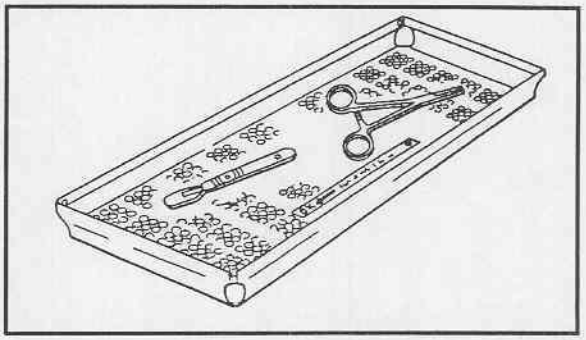
– Never stack trays on top of one another. At least one inch should separate trays.

– Wrapped trays and packs must **not** touch the sides of the sterilizer.

– Do not overload trays. Overloading may cause a sterilization failure.

B. **Unwrapped trays** are prepared for sterilization of non–surgical instruments and cannisters to prevent transmitting infectious disease. Always include a process or spore test indicator with every sterilizer load.

1. **Loose Instruments**



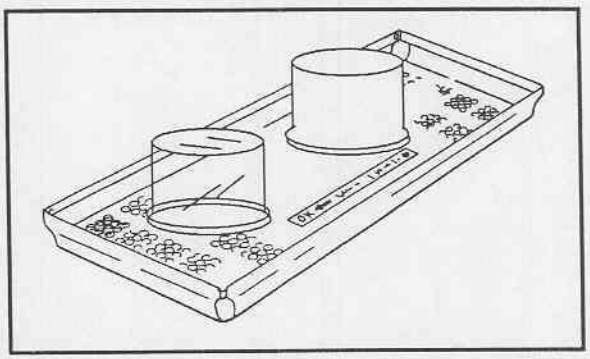
a. Distribute a single layer of instruments in the bottom of a perforated tray. Provide adequate space between instruments for steam circulation. Do not overload. Be sure to include a process or spore test indicator.

b. Place tray on rack in sterilizer.

NOTE: If multiple layers of instruments are to be separated by fabric see instructions for preparing wrapped trays.

c. See Section 3, page 11, for operating instructions.

2. **Open Metal or Glass Cannisters**



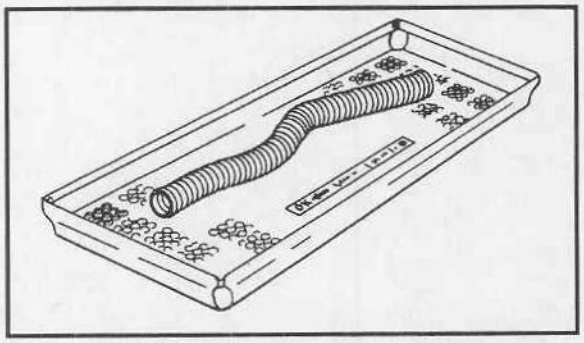
a. Place open metal and glass cannisters on a perforated tray. Tilt the cannister down to provide adequate steam penetration. Be sure to include a process or spore test indicator.

b. Place tray on rack in sterilizer. Do not overload. Inadequate sterilization and drying will result.

c. Make sure containers are placed so that they will drain. Otherwise, adequate drying will not be possible.

d. See Section 3, page 11, for operating instructions.

3. Rubber Tubing



a. Clean tubing thoroughly.

b. Rinse with pyrogen free water and leave wet. Leave both ends open, coil and wrap without kinks or sharp bends.

c. Place tubing on an autoclave tray. Be sure to include a process or spore test indicator.

d. Place tray on rack in sterilizer. **Do not** overload. Inadequate sterilization and drying will result.

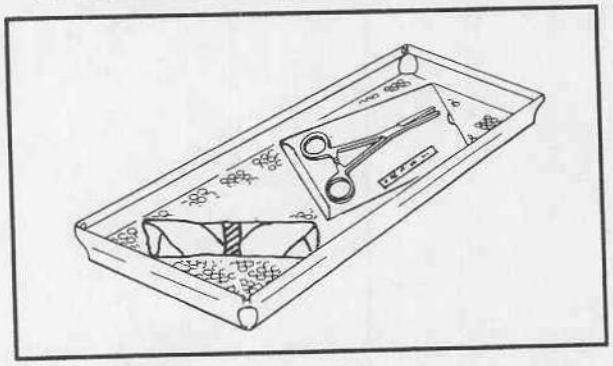
CAUTION: Tubing which will come in contact with a surgical wound should be prepared as outlined above and wrapped to maintain sterility.

e. See Section 3, page 11, for operating instructions.

C. Wrapped Trays and Instruments

There are several ways to prepare wrapped trays. See Table 2–2, page 10, for acceptable wrapping materials.

1. Individually wrapped instruments



a. Individually wrap instruments that have been cleaned according to Section 2–I, page 5 in autoclave bags or paper (3M, St. Paul, MN; Propper, Long Island City, NY). Do not tightly roll instruments in paper.

b. Seal with autoclave tape or heat sealer (3M, St. Paul, Mn; Propper, Long Island City, NY).

CAUTION: Do not use staples, pins or other devices which will puncture the packaging material. Otherwise, sterility may be compromised.

c. Place individually wrapped instruments on perforated trays. Provide adequate space between instruments for steam circulation.

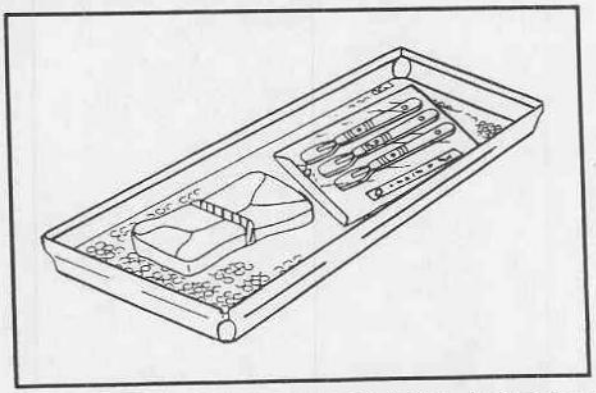
CAUTION: Do not overload trays or inadequate sterilization may result.

d. Include a process or spore test indicator. Place the indicator inside an individually wrapped instrument which will be placed in the front of the bottom tray.

e. Place trays on the rack in the sterilizer. Ensure adequate space is provided between trays to allow steam circulation.

f. See Section 3, page 11, for operating instructions.

2. Wrapped Instruments



a. Collect a group of similar instruments which have been cleaned according to Section 2–I, page 5.

or

Collect instruments used for a particular procedure (i.e. amalgam, exam, etc.) which have been cleaned according to Section 2–I, page 5. Do not mix dissimilar metals.

b. Place instruments in autoclave bag (3M, St. Paul, MN; Propper, Long Island City, NY).

or

Loosely wrap instruments in 2–4 layers of muslin towels or autoclave paper (3M, St. Paul, MN; Propper, Long Island City, NY).

CAUTION: Do not wrap instruments too tightly. Inadequate sterilization may result from improper wrapping or placing too many instruments per package. (If a large number of instruments per package are desired, see Section 2–III–D, page 8, for PACKS).

c. Place a process or spore test indicator inside a representative bag.

d. Seal with autoclave tape (3M, St. Paul, MN; Propper, Long Island City, NY) or heat sealer.

CAUTION: Do not use staples, pins or other devices which will puncture the packaging material. Otherwise, sterility may be compromised.

e. Place packages on perforated trays. Ensure adequate space between packages to allow steam circulation.

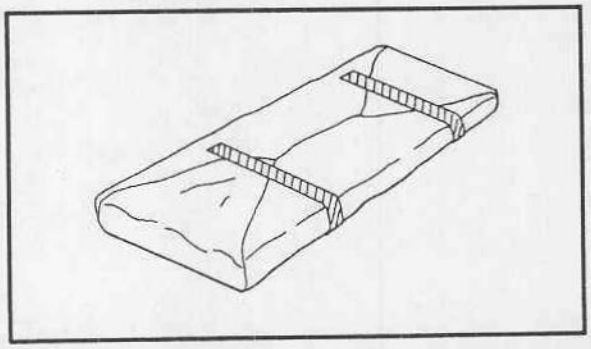
NOTE: Place the package containing the sterilization monitor in the front of the bottom tray.

f. Load tray in the rack in the sterilizer. Ensure adequate spacing between trays to allow steam circulation.

CAUTION: Do not overload. Inadequate sterilization may result.

g. See Section 3, page 11, for operating instructions.

3. Wrapped Trays



a. Place instruments, cleaned according to Section 2–I, page 5, in a perforated tray. Allow adequate space between instruments for steam circulation.

b. Place a process or spore test indicator in at least one tray to be cycled.

c. Wrap the tray in 2–4 layers of towels or other wrapping material. (See Table 2–2, page 10). Close using autoclave tape.

d. Place wrapped trays on the rack in the sterilizer. Ensure that the wrapping does not touch the sides of the chamber. Allow adequate space between trays for steam circulation.

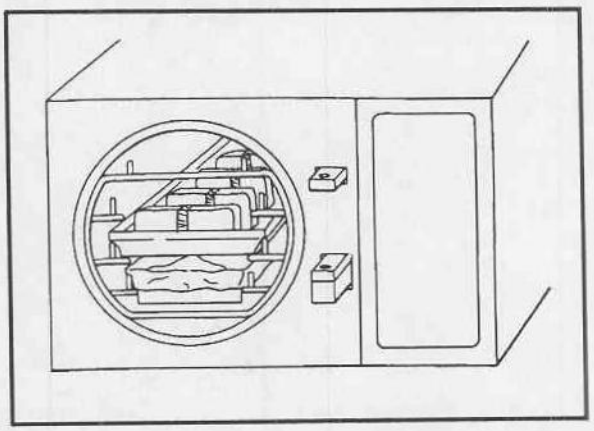
NOTE: Place the tray containing the sterilization monitor in the bottom of the sterilizer.

CAUTION: Do not overload. Inadequate sterilization will result.

e. See Section 3, page 11, for operating instructions.

D. Packs

Packs are for sterilizing surgical instruments, gloves and textiles.



1. Instruments and textiles

a. Clean instruments according to Section 2–I, page 5. Textiles should be laundered prior to sterilization.

CAUTION: Do not use high chlorine or phosphate content detergents or chlorine bleach in laundering items prior to sterilization. Staining of the autoclave and instruments (or more severe damage) may result. The use of chlorides may also result in cracks in the chamber.

b. Loosely package instruments with not more than 10 per pack. Instruments of the same type which are nested should be separated by a layer of absorbent towels and placed so that water will run out. Loosely roll or fold textiles.

CAUTION: Density should not exceed 1/2 the capacity of the pack and the packs should not exceed 1/2 the capacity of the tray. Otherwise, inadequate sterilization could result.

or

Wrap properly cleaned articles in 2–4 layers of muslin towels or other packaging material. (See Table 2–2, page 10).

c. Place a process or spore test indicator inside a representative pack.

d. Seal with autoclave tape or heat sealer (3M, St. Paul, MN; Propper, Long Island City, NY).

CAUTION: Do not use staples, pins or other devices that could puncture packaging material. Otherwise, sterility could be compromised.

e. Place packs on perforated trays. Leave adequate space between packs to allow steam to circulate. Load packs upright, side–by–side on the tray. Do not stack.

CAUTION: Adequate drying will not occur unless space is left between packs. Metal and glass containers should not be used to separate packs as these will inhibit drying. Packs should not exceed 1/2 the capacity of the tray. Otherwise, sterilization could be compromised.

f. Load trays onto the racks in the sterilizer. Ensure that packs do not touch the sides of the chamber. Allow adequate space between trays for steam circulation. If packs are large, some trays may be omitted to allow more clearance.

CAUTION: Do not overload. Inadequate sterilization may result.

g. Place pack containing sterilization monitor in the bottom front of the sterilizer.

h. See Section 3, page 11, for operating instructions.

2. Surgical gloves

NOTE: Disposable gloves should not be sterilized.

a. Clean and dry gloves.

b. Place a square of muslin or other absorbent towel into the glove up to the finger.

c. Place a strip of muslin or other absorbent towel around the cuff and fold it back.

d. Place a process or spore test indicator in one glove. Wrap gloves in muslin or other packaging material. (See Table 2–2, page 10.)

e. Place wrapped packs of gloves on end in a perforated tray. Leave space between packs to allow steam to circulate.

f. Load trays onto rack in the sterilizer. Leave adequate space between trays for steam circulation. Ensure that packs do not touch sides of chamber.

CAUTION: Do not overload. Inadequate sterilization may result.

g. Place pack with sterilization monitor in the front bottom tray.

h. See Section 3, page 11, for operating instructions.

IV. LIQUIDS PREPARATION

A. Place liquids in a heat proof glass container, filled 2/3 full.

B. Cover container loosely. Do not seal container.

C. Place container on a perforated tray. Include a process or spore test indicator. Load onto the rack in the sterilizer. (See Section 3, page 11, for operating instructions.)

Table 2-2 WRAPPING MATERIALS FOR STEAM STERILIZATION

SUITABLE	UNSUITABLE
Muslin 2 (layers)	Canvas
Nylon bagging material	Aluminum foil
Kraft paper	Steam impermeable plastics
Commercial autoclave paper (must be as permeable as muslin)	Sealed tubes, jars and cannisters
Plastic and paper bags (must be permeable)	Drums not recommended
Cloth or paper covered trays	

SECTION 3 – OPERATIONS

I. START OF DAY

A. Power ON

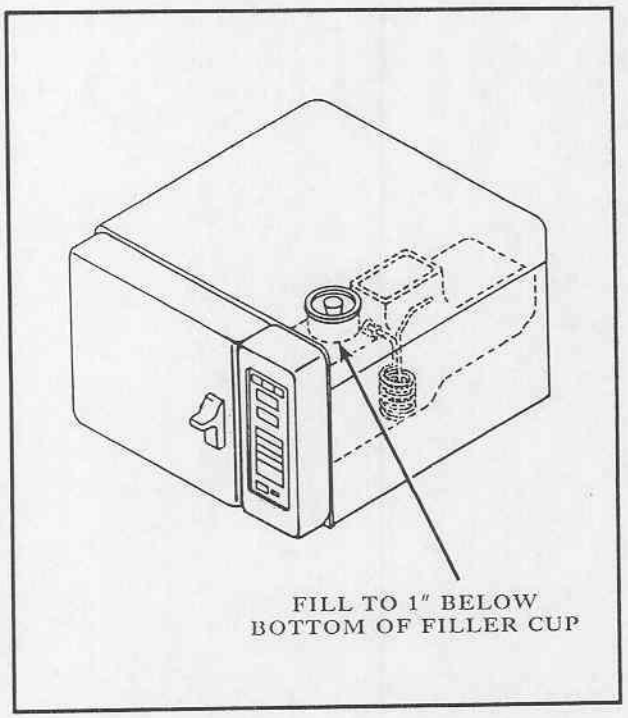
1. Depress POWER switch.
2. Red POWER light verifies that power is being supplied to the unit.

B. Perform optional self-diagnostic check as needed. (See Section 4–II, page 14).

C. Check Reservoir Level

1. Add distilled deionized water to approximately 1" below bottom of filler cup opening. Unit must have water covering condenser coil to operate properly.

   NOTE: Do not overfill. Filling reservoir too full may cause water to boil over if several cycles are run in rapid succession.



II. STERILIZER OPERATION

A. Power ON

With the POWER switch ON, the red POWER light verifies that power is being supplied to unit.

B. Load

1. Open chamber door.
2. Load autoclave trays as directed in Section 2–III, page 6.
3. Close and latch the chamber door.

   NOTE: To maintain sterilization when unloading chamber, clean and disinfect chamber door handle if there was a possibility of contamination during loading.

C. Select Program

1. Depress desired program switch.
2. A red light comes on to the left of program switch to verify the selection. See Table 3–1, page 13, for program parameters.

D. Start

1. Depress green CLEAR/START switch.
2. Water immediately begins to fill the chamber and the °C/Min window displays the word FILL.

3. Once the fill cycle is complete, the red STERILIZE light comes on.

E. Sterilize

1. As the chamber heats up, the °C/Min window displays the rising temperature in °C and the pressure window displays the building pressure in one kPa increments. Temperature and pressure rise until the programmed values for sterilization are reached. The red STERILIZE light remains illuminated constantly to indicate heat up.
2. Once the required temperature and pressure are reached, the °C/Min window changes and displays the time required for sterilization. Then countdown begins for the remaining time required for sterilization. The red STERILIZE light begins to flash, signaling the start of the sterilization cycle.

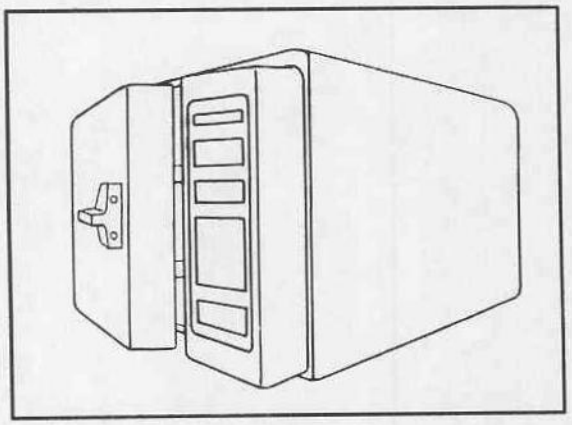
F. Ready/Dry

1. At the end of the sterilization cycle, the chamber is automatically vented. When the chamber pressure reaches zero, five beeps sound. The red STERILIZE light extinguishes and the yellow DRY light and green READY light begin to flash. Once the flashing green READY light is on, the autoclave may be unloaded without finishing the dry cycle.

   NOTE: Items should not be removed from sterilizer until completely dry. However, dryarticles may be removed from the sterilizer any time the green READY light is illumin-ated. It is not necessary to wait until completion of the drying cycle to remove articles from the autoclave.

2. The 30 minute drying cycle now begins. The °C/Min window displays 0:00 and then begins to count up to 30:00, indicating the amount of drying time that has elapsed.

   NOTE: In the LIQUIDS program, there is no drying cycle.



   NOTE: To speed the drying, it is recommended that the door be cracked open (door open and latch pins against latch bar).

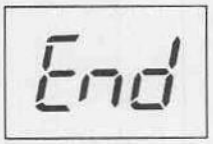
G. Restart

1. If the sterilizer is unloaded before the drying cycle is completed, the program must be cleared by depressing the CLEAR/START button.

2. A new cycle may now begin. See Section 3-II-D, page 11.

H. Unloading

1. The chamber may be unloaded at any time during the drying cycle. At the end of the drying cycle, the °C/Min window displays a flashing END signal and 10 beeps are sounded.



2. The flashing yellow DRY light goes out as the green READY light continues to flash.

   NOTE: When removing sterile instruments from the autoclave, handle with care. They may still be hot.

3. When the END signal is displayed, the heaters automatically shut off. This prevents possible damage if the autoclave is left unattended.

III. END OF DAY

A. Depress the POWER switch OFF. The red POWER light goes out.

B. Wipe and inspect the door gasket.

C. Inspect the filter.

D. Clean any spills from the bottom of the chamber.

Table 3-1 PROGRAM PARAMETERS*

PROGRAM	**TEMP/**PRES/TIME	ITEMS TO BE STERILIZED
UNWRAPPED	132 ° C / 210 kPa for 3 minutes	Non-surgical instruments, loose on a tray. Open glass or metal cannisters. Heat resistant rubber tubing, which will not be used in surgical application. Any items where 132° C for 3 minutes is appropriate.
WRAPPED	132 ° C / 210 kPa for 12 minutes	Loosely wrapped individual instruments. Multiple layers of instruments separated by fabric. Wrapped trays of loose instruments. Rubber tubing. Any items where 132° C for 12 minutes is appropriate.
PACKS	121 ° C / 128 kPa for 30 minutes	Common groups of surgical instruments in commercially prepared packs. Surgical instruments subject to prolonged storage. Surgical gloves wrapped for sterilization. Any items, other than liquids, where 121° C for 30 minutes is appropriate.
LIQUIDS	121 ° C / 128 kPa for 30 minutes	Liquids or gels that could boil over or spill out of the container. At the end of the sterilizing cycle, venting is slowed to allow heat in the liquid to dissipate slowly and eliminate boil overs. Venting occurs at 16 kPa to complete the cycle. There is no drying cycle in the LIQUIDS mode.

* For mixed loads, use the longer or lower temperature program (i.e. for loose instruments and surgical dressings in packs, use PACKS).

** Time and temperature are minimums.

NOTE: When sterilizing handpieces, check manufacturer's recommendations for maximum temperature. Use WRAPPED program only if handpieces are able to withstand 132°C temperature. Otherwise use PACKS program.

The names of the various modes of operation are general categories. Use good judgement when selecting the mode of operation. First, take into consideration the density of the individual load and the ability of the steam to circulate and penetrate wraps. Then determine the correct programmed values to assure sterilization.

SECTION 4 – OPERATIONAL CHECKS

I. OPERATING ALARMS

Five alarms can occur during a sterilization cycle. All alarms are indicated by a "beeping" sound for one minute (or until cause is corrected) and a flashing alarm display in the °C/Min window. The alarm display will remain visible until the problem is corrected or until the CLEAR/START button is depressed. See Table 4–1.

TABLE 4–1 OPERATING ALARMS

DISPLAY	CAUSE	ACTION
door	Chamber door not fully closed.	Shut door properly.
H2O	Not enough water in chamber.	Add distilled water to reservoir.
FAIL	Failure to fill properly. Failure to seal against pressure.	Turn off POWER switch and call an authorized service representative.
	Not enough water in chamber.	Add distilled water to reservoir.
	More than a 3 minute lapse during countdown.	Clear unit. Restart cycle. If problem reoccurs, turn off POWER switch and call an authorized service representative.
	Leak in gasket.	Check door gasket for leakage and clean or replace as needed.
	Chamber overloaded.	Check chamber for proper loading and remove some packages/articles which may be impeding proper steam circulation.
PRES	Overpressure in the system.	Clear unit. Restart cycle. If problem reoccurs, turn off POWER switch and call an authorized service representative.
SENS	Broken circuit in surface temperature sensor.	Turn off POWER switch. Call an authorized service representative.

II. SELF–DIAGNOSTIC CHECK

The autoclave performs a diagnostic self–check on eight key components for operational continuity.

A. Operational Check

1. Depress and hold START/CLEAR switch while depressing then releasing the POWER switch. The autoclave beeps once, signaling the beginning of the self–diagnostic procedure.
2. The °C/Min window displays the self–diagnostic check procedure. See Table 4–2, page 15, for explanation of procedure.

   a. The operational check sequence number with a NO message, or lights and segments visually verified as non–operational, indicate an unsatisfactory check. At the end of the diagnostic check, the highest sequence number with an unsatisfactory check is displayed in the °C/Min window. As each problem is corrected, the next highest number with an unsatisfactory check is displayed until all diagnostic checks are satisfactory.

   b. Call an authorized service representative if an unsatisfactory check is indicated.

Table 4-2 DIAGNOSTIC SEQUENCE NUMBERS

SEQUENCE NUMBER	CHECK DISPLAY	COMPONENTS CHECKED	OPERATIONAL FUNCTION CHECKED
1	GO/NO	Pressure Sensor	Electrical continuity.
*2	GO/NO	Steam Temperature Sensor	Electrical continuity.
3	GO/NO	Chamber Wall Temperature Sensor	Electrical continuity.
4	Blue Display Windows	kPa/°C/Min Displays	All Display segments illuminate for visual inspection. Proper operation is indicated by displays of 8:88 in the kPa window and 8.8:8.8 in the °C/Min window.
5	Other LEDS	Cycle Indicator Lights Program/Power Indicators	All indicator lights illuminate for visual inspection.
6	GO/NO	Vent Solenoid	Solenoid operation and electrical continuity.
7	GO/NO	Fill Solenoid	Solenoid operation and electrical continuity.
8	GO/NO	Exhaust Solenoid	Solenoid operation and electrical continuity.

*No. 2 may indicate a "NO" when unit is cold. Perform the test after unit has been turned on.

SECTION 5 – MAINTENANCE

I. PREVENTIVE MAINTENANCE SCHEDULE

CHECK	FREQUENCY	PROCEDURE	ACTION
Clean chamber	Weekly	3 ozs. Omni–Cleaner to 1 qt. distilled water on WRAPPED program cycle.	See Section 5–II.
Safety valve ring	Every 3 months	Manually pull ring with chamber under pressure. **WARNING:** When ring is pulled on safety valve with unit under pressure, steam is discharged from the chamber at a high temperature. Keep clear of steam discharge path to avoid burns. Use of a hot pad or instrument to pull ring is suggested.	If valve does not open, turn off POWER and call for service.
Door gasket	Weekly	Inspect and clean using Omni–Cleaner or mild detergent and distilled water. Check for leaks (have leaking gasket replaced).	Call authorized service representative for replacement gaskets.
Door Latch	Weekly	Inspect latch mechanism.	Call authorized service representative for improper closure or signs of wear.
Door Switch	Weekly	With door open, attempt to start cycle. If door alarm does not appear on alarm display, door switch is defective or requires adjustment. Do not operate unit.	Call authorized service representative.
Boiler ring	Weekly	Inspect and clean using non–chlorinated pad which contains no metal.	
Self–diagnostics	Every 3 months or as needed.	See Section 4–II, page 14.	Call authorized service representative if unsatisfactory check is seen.

II. CLEANING PROCEDURES

A. Drain Reservoir

Quick Connect Drain Tubes

1. With the door open, locate the two quick drain connections at the lower right corner of the face plate. Press each of the two drain tube connectors provided with the unit into the connections on the face plate. This opens the drain lines and draining of the reservoir and fill tank will begin immediately.

Extending Drain Tubes

1. Pull drain tubes out from under the front of the autoclave. Drain tubes will extend 4" (10.2 cm).
2. Unscrew knurled caps to open tubes and drain reservoir and fill tank.
3. When draining is complete, replace caps and push drain tubes back under the unit.

B. Normal Chamber Cleaning

1. Mix three ounces (88.7ml) of Omni-Cleaner per quart (.9L) of distilled deionized water for a normal cleaning solution. For extremely dirty chambers, solution may be increased to four ounces (118.3ml) per quart (.9L) of distilled or deionized water and may require three cleaning cycles.
2. Add one gallon (3.8 L) of cleaning solution to reservoir.
3. Complete one WRAPPED program cycle and one UNWRAPPED program cycle (132°C minimum 210 kPa for 12 Min.) for each cleaning cycle.

   NOTE: Instruments should not be sterilized while cleaning autoclave.
4. At the end of the cycle, pull both drain tubes out. Unscrew caps and drain cleaning solution from reservoir and fill tank.
5. Rinse thoroughly by filling reservoir with clear distilled deionized water and run WRAPPED program cycle again.
6. Drain rinse water from reservoir and fill tank as outlined in Step 4.
7. Very carefully wipe inside of chamber.
8. Refill reservoir with distilled deionized water. Autoclave is ready for use.

C. Cleaning Deposits and Discoloration on Stainless Steel

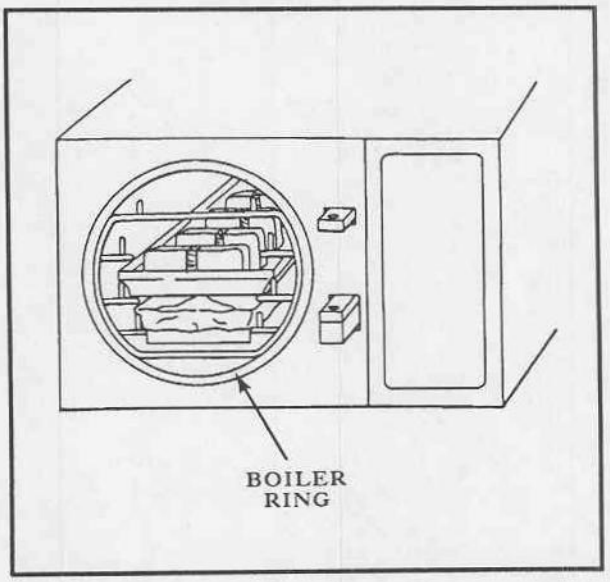
1. For deposits not removed by detergent solution, use a non-chlorinated scouring pad containing no metal.

   NOTE: Do not use ordinary steel wool or steel brushes on stainless steel. Pads containing metal will damage chamber.
2. Rub in direction of pattern or grain of the metal.
3. Stainless steel surfaces contaminated with discoloration can be cleaned with a 5% solution of warm oxalic acid.

D. Boiler Ring

1. Clean boiler ring using a non-chlorinated scouring pad containing no metal.

   NOTE: Pads containing metal will damage chamber.



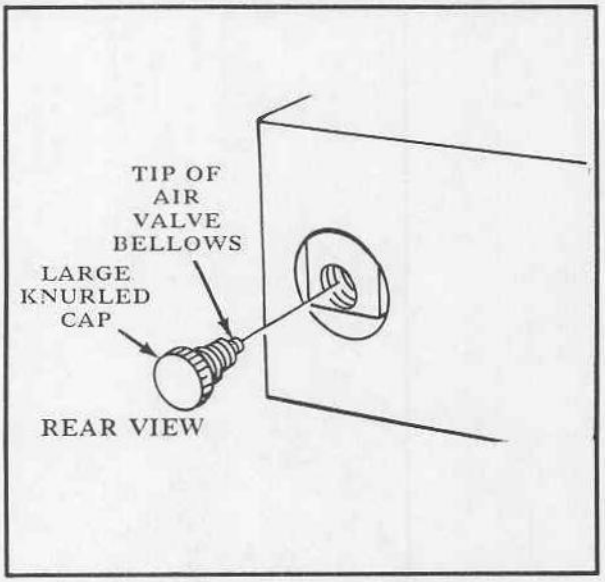
E. Door Gasket

1. Clean door gasket with Omni-Cleaner or ordinary detergent and water.

   NOTE: If residue is allowed to accumulate, the seal could be affected and leaks may occur.

F. Air Valve

(User accessible on Validator 8 only)



1. The air valve is factory set. However, if debris becomes lodged in valve, it may be necessary to remove large knurled cap and clean tip of air valve bellows and seat.

G. Cleaning Exterior Surfaces

1. Clean all exterior surfaces with mild detergent and water using a sponge or cloth.

2. Exterior surfaces may be disinfected using an iodophor (Biocide, Biotrol, Inc., N. Salt Lake City, Utah, or equivalent), glutaraldehyde (Cidex, Surgicos, Dallas, TX, or equivalent) or sodium hypochlorite (household bleach diluted 1:10–1:100. Do not use household bleach on interior stainless steel surface.

III. STERILIZATION ASSURANCE

A. Clinical Record Keeping

Validate daily and weekly records to substantiate procedures taken to assure sterilization.

B. Techniques for sterilization assurance:

1. Use dated color change indicator closure tapes (3M, St. Paul, MN; Propper, Long Island City, NY,) on all packs or use bags with process indicators.

2. Use internal process indicator strips inside all sterilizer loads to verify gross heat penetration.

3. Use a biological spore test indicator (Attest® Biological Monitoring System, 3M, St. Paul, MN; Propper, Long Island City, NY,) inside a representative sterilizer load weekly.

4. Follow manufacturer's instructions for using all test materials and maintaining good clinical records. Contact dealer to obtain biological test indicators that meet AAMI standards.

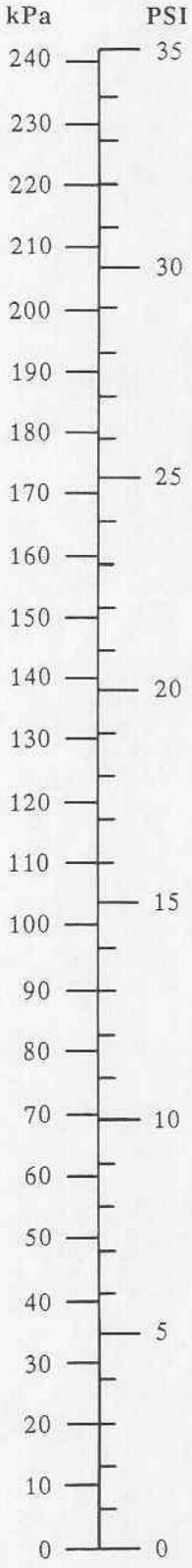
5. Follow Preventive Maintenance schedule (see Section 5–I, page 16,) to ensure proper operation of the autoclave.

GLOSSARY

Asepsis:	Freedom from infective microorganisms.
Autoclave:	A container for sterilizing by steam under pressure.
Bioburden:	The level of organisms on a particular item at a specific time.
Biological Monitor or Spore Test:	A preparation of resistant microorganisms which is used to verify sterilization. Usually requires incubation which may be performed by an independent laboratory.
Cold Sterilant:	An agent which sterilizes at room temperature. Usually a chemical such as gluteraldehyde.
Disinfection:	Destruction of bacteria.
Pathogen:	Any microorganism or virus that can cause disease.
Process Monitor:	An indicator which is sensitive to at least one sterilization parameter. Useful to indicate sterilization bypass but does NOT indicate sterilization. Examples: autoclave tape, heat-sensitive bag markings, heat sensitive marked strips, fusible glass melting pellets.
Sanitize:	To make an item surgically clean but not necessarily sterile. Usually accomplished using a low-level disinfectant.
Septic:	Unsterile. Infection caused by introduction of pathogenic microorganisms.
Spores:	The reproductive cell of some microorganisms which is highly resistant.
Sterilization:	Total destruction of all microbial life including bacteria, viruses and spores.
Ultrasound:	A type of cleaner which uses ultrasonic waves at high frequency to agitate contaminants and dirt from items.
Vegetative Bacteria:	A freely multiplying form of bacteria.

AUTOCLAVE CONVERSION SCALE

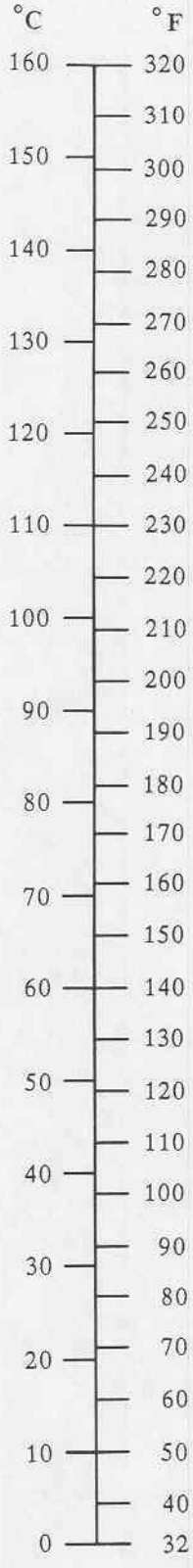
PRESSURE



1 PSI = 6.89 kPa

1 kPa = 0.145 PSI

TEMPERATURE



°C = 5/9 (°F–32°)

°F = (9/5 X °C) + 32°